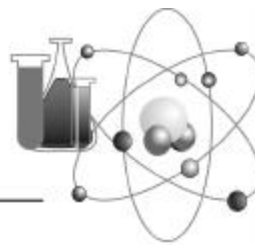


# FACTS ON FILE EMSP

## Environmental Management Science Program



### Project Highlights

*The Environmental Management Science Program (EMSP) is funding basic research projects focused on solving the most difficult problems that threaten the closure plans of DOE sites. This fact sheet highlights just one.*

### Removal of Technetium, Carbon Tetrachloride, and Metals from DOE Properties

The objective of this project is to develop and characterize supported reducing agents, and solid waste forms derived from them, which will be effective in the removal of transition metal ion, chlorinated organic molecules, and technetium from aqueous mixed wastes. The work follows the recent discovery that zero-valent metals, such as iron, are effective decontaminants for waste streams containing chlorinated hydrocarbons. Preliminary data have shown that the same strategy will be effective in reducing soluble compounds containing toxic metals (technetium, lead, mercury, and chromium) to insoluble forms.

Researchers have prepared a new class of powerful reducing agents, called Ferragels, which consist of finely divided zero-valent metals on high surface area supports. The project will further develop and investigate the application of these composite materials to problems relevant to the DOE-EM mission, namely the detoxification of waste streams containing technetium, carbon tetrachloride, and toxic metal ions.

**Locations:** Pennsylvania State University, Pacific Northwest National Laboratory

**Office of Environmental Management (EM)**  
**Problem Area:** High Level Waste

**Year of Award:** 1997

**Office of Science (SC) Scientific Category/Sub-Category:** Separations Chemistry/Technetium Chemistry and Separations

**Amount of Award:** \$390,000

**Research Value/Impact:** To date researchers have studied the kinetics of reduction using Ferragels, as compared to those of unsupported iron. The most easily reduced metals—chromium, mercury, and lead—were removed to levels below the detection limits of atomic adsorption spectroscopy, typically 2–20 ppb, and the rates of these reactions were substantially faster than with activated, unsupported iron. These studies are intended to lay the groundwork for design of contaminant-selective monolayer coatings.

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